

**WHAT IS CLAIMED IS:**

1           1. A key signal scanning apparatus of a complex telephone operated by using external  
2 power and by using a loop voltage when the external power is not supplied, said apparatus  
3 comprising:

4           a keypad having row ports, column ports, and keys for outputting a key signal in  
5 accordance with pressing of a key by a user;

6           a main microprocessor which operates by the external power for supplying a timing signal  
7 to the row ports of the keypad by using row output ports, for receiving the key signal from the  
8 column ports of the keypad by using column input ports, for detecting the key pressed by the user  
9 by scanning the received key signal, and for outputting a first dialing signal corresponding to the  
10 detected key;

11           a sub microprocessor which operates when the external power is not supplied for outputting  
12 a second dialing signal according to the key signal from the keypad, the sub microprocessor having  
13 row ports and column ports;

14           a first separator circuit for cutting off current flow to the row output ports of the main  
15 microprocessor from the row ports of the sub microprocessor; and

16           a second separator circuit for cutting off current flow to the column ports of the sub  
17 microprocessor from the column input ports of the main microprocessor when the external power  
18 is not supplied.

1           2. The key signal scanning apparatus of claim 1, further comprising a third separator  
2 circuit for cutting off current flow to the column ports of the sub microprocessor from the column  
3 ports of the keypad when the external power is supplied.

1           3. The key signal scanning apparatus of claim 2, wherein the third separator circuit  
2 comprises resistance elements connected to each column port of the keypad and to each column  
3 port of the sub microprocessor.

1           4. The key signal scanning circuit of claim 2, wherein the second separator circuit has an  
2 output connected to the column inputs of the main microprocessor, and an input connected to both  
3 the column ports of the keypad and a first side of the third separator circuit, a second side of the  
4 third separator circuit being connected to the column ports of the sub microprocessor.

1           5. The key signal scanning circuit of claim 1, wherein the first separator circuit comprises  
2 diode elements having anode terminals connected to respective row output ports of the main  
3 microprocessor, and having cathode terminals connected to respective row ports of the keypad.

1           6. The key signal scanning apparatus of claim 1, wherein the second separator circuit  
2 comprises bipolar transistor elements having emitter terminals connected to respective column  
3 input ports of the main microprocessor, and having collector terminals connected to respective  
4 column ports of the keypad.

1           7. The key signal scanning apparatus of claim 1, wherein the second separator circuit  
2 comprises field effect transistor elements having source terminals connected to respective column  
3 input ports of the main microprocessor, and having drain terminals connected to respective column  
4 ports of the keypad.

1           8. The key signal scanning apparatus of claim 1, wherein the first separator circuit has an  
2 input connected to the row output ports of the main microprocessor, and an output connected to  
3 both the row ports of the sub microprocessor and the row ports of the keypad.

1           9. A key signal scanning apparatus of a complex telephone operated by using external  
2 power and by using a loop voltage when the external power is not supplied, said apparatus  
3 comprising:

4           a keypad having row ports, column ports, and keys for outputting a key signal in  
5 accordance with pressing of a key by a user;

6           a main microprocessor which operates by the external power for supplying a timing signal  
7 to the row ports of the keypad by using row output ports, for receiving the key signal from the  
8 column ports of the keypad by using column input ports, for detecting the key pressed by the user  
9 by scanning the received key signal, and for outputting a first dialing signal corresponding to the  
10 scanned key;

11          a sub microprocessor which operates when the external power is not supplied for outputting

12 a second dialing signal according to the key signal from the keypad, the sub microprocessor having  
13 row ports and column ports;

14 a first separator circuit for cutting off current flow to the column ports of the sub  
15 microprocessor from the column input ports of the main microprocessor when the external power  
16 is not supplied; and

17 a second separator circuit for cutting off current flow to the column ports of the sub  
18 microprocessor from the column ports of the keypad when the external power is supplied.

1 10. The key signal scanning apparatus of claim 9, wherein the second separator circuit  
2 comprises resistance elements connected to each column port of the keypad and to each column  
3 port of the sub microprocessor.

1 11. The key signal scanning apparatus of claim 9, wherein the first separator circuit has  
2 an output connected to the column inputs of the main microprocessor, and an input connected to  
3 both the column ports of the keypad and a first side of the second separator circuit, a second side  
4 of the second separator circuit being connected to the column ports of the sub microprocessor.

1 12. The key signal scanning apparatus of claim 9, wherein the first separator circuit  
2 comprises bipolar transistor elements having emitter terminals connected to respective column  
3 input ports of the main microprocessor, and having collector terminals connected to respective  
4 column ports of the keypad.

1           13. The key signal scanning apparatus of claim 9, wherein the first separator circuit  
2           comprises field effect transistor elements having source terminals connected to respective column  
3           input ports of the main microprocessor, and having drain terminals connected to respective column  
4           ports of the keypad.